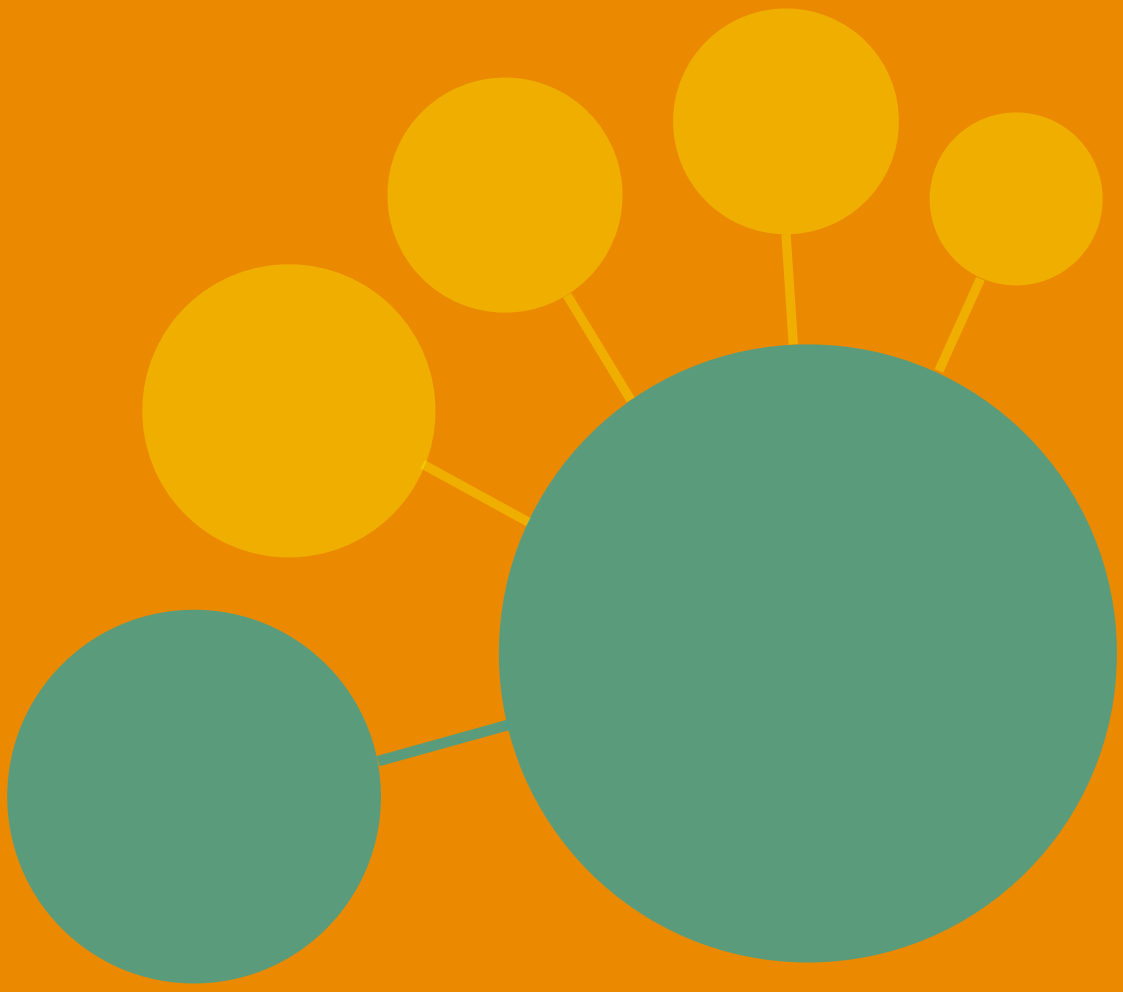
ScotPHO
Public Health Information for Scotland

Scottish Burden of Disease Study, 2015

Depression technical overview



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Background

The Scottish Burden of Disease (SBoD) study team have published comprehensive estimates of the burden of disease and injury in Scotland for 2015 [1]. The purpose of this technical overview is to provide background information on the data and methodology used, noting any caveats associated with estimating the burden of depression in SBoD.

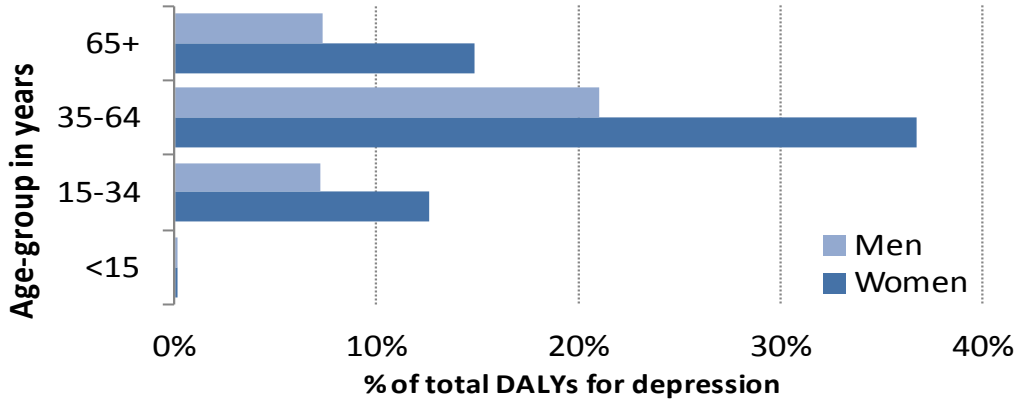
Burden of disease studies aim to estimate the difference between ideal and actual health in a country or region at a specific point in time. Individuals can suffer non-fatal health loss due to suffering disability attributable to a disease, condition or injury, or suffer fatal health loss which is early death due to a disease, condition or injury. To quantify the total burden, non-fatal and fatal health loss are combined to produce a single metric called the Disability-Adjusted Life Year (DALY).

Further information about the SBoD study, including a more thorough explanation of the methodology used, overview reports, detailed results and other specific disease briefings, can be found on the website of the Scottish Public Health Observatory (ScotPHO) [1].

Estimated burden due to depression

Depression was the third leading cause of disease burden in Scotland in 2015, resulting in a total of approximately 76,000 DALYs. The burden of depression was fully attributed to individuals suffering health loss due to living with depression.

Figure 1 Percentage of total DALYs by gender and age-group for depression



Women contributed a higher proportion of the burden (64%) than men (36%). Overall, 78% of the total depression burden was contributed by individuals aged 15 to 64 years, as outlined in Figure 1. Note that the burden which we are describing is the absolute burden and has not been adjusted for the age/gender case-mix.

How did we produce these estimates?

DALYs attributed to a disease, condition or injury are calculated by combining estimates from two individual metrics: Years of Life Lost (YLL) due to premature mortality and Years Lived with Disability (YLD).

Years of Life Lost (YLL) due to depression

Each single death contributes to the total YLL through calculating the difference between the age at death and the life expectancy at that age. Although depression may lead to loss of life through (for example) suicide, depression is not regarded, in itself, as a valid clinical cause of death in burden of disease studies. There is, therefore, no YLL component in the DALY for this condition; the entire burden estimated comes from non-fatal consequences of health loss due to depression [2].

Years Lived With Disability (YLD) due to depression

Years lived with disability (YLD) are estimated using:

- disease and injury prevalence estimates
- levels of severity
- disability weights

Our sources of information for these three components are as follows:

Estimating the number of individuals suffering disability

To estimate prevalent cases of depression in 2015, the Prescribing Information System (PIS) was used [3]. This dataset contains records for reimbursement purposes on prescription items dispensed in the community to individuals. It holds structured data relating to the issued generic or branded drug item such as the date of dispensing, strength, formulation and quantity.

The PIS dataset has a Community Health Index (CHI) number attached to almost 100% of prescription items, which allows for the identification of records for an individual [3]. This CHI number has been linked to records from the National Records of Scotland (NRS) register of deaths, to exclude individuals that have died from prevalence estimates that relate to a period following their date of death [4]. The number of individuals that were dispensed an antidepressant prescription item between 01 January to 31 December 2015 was used to estimate the number of prevalent cases. Antidepressants have multiple indications for use out-with depression, so our selection made exclusions based on the classification in the British National Formulary (BNF) to restrict inclusion to items that were the best proxy for depression and anxiety disorders [5]. We included prescription items from BNF section 4.3, omitting lower strength doses of amitriptyline, where the included doses were restricted to 50mg and 50mg/5ml or greater.

In order to obtain an estimate of the number of individuals suffering disability due to depression only, relative prevalence ratios between depression and anxiety disorders were constructed by age-group and gender, using worldwide prevalence estimated from the Global Burden of Disease (GBD) 2015 study [6]. The estimated relative worldwide prevalence ratios of depression and anxiety disorders in 2015

were applied to the community prescriptions estimate to produce an estimate of the number of prevalent cases for depression in 2015.

Using this method of identifying prevalent cases of depression, we estimated that there were approximately 362,100 individuals in the Scottish population suffering disability due to depression in 2015.

Severity distribution and disability weights

The levels of severity and disability due to depression in Scotland were based on the specifications of the GBD 2015 study [6]. This allowed prevalent cases to be disaggregated by levels of severity and the associated disability at each level of severity. The disability weights were developed by the GBD study through surveys of the general public and take into account the consequences of each disease, condition and injury [7]. The severity distributions and disability weights for depression are outlined in Table 1.

Table 1 Description and allocation to severity levels for depression with corresponding disability weight

Severity level	Description	% of individuals	Disability weight
Asymptomatic	Experiences no symptoms by virtue of, for instance being on treatment or because of the natural course of the condition.	13	Nil
Mild	Feels persistent sadness and has lost interest in usual activities. The person sometimes sleeps badly, feels tired, or has trouble concentrating but still manages to function in daily life with extra effort.	60	0.145
Moderate	Has constant sadness and has lost interest in usual activities. The person has some difficulty in daily life, sleeps badly, has trouble concentrating, and sometimes thinks about harming himself (or herself).	17	0.396
Severe	Has overwhelming, constant sadness and cannot function in daily life. The person sometimes loses touch with reality and wants to harm or kill himself (or herself).	10	0.658

Dysthymia (abnormal mood) is considered to be part of the disease model in GBD 2015, however in Scotland, this is likely to be treated and classified as mild depression [6]. In the GBD 2015 study, the disability weight for dysthymia was the same as mild depression, and patients are likely to be treated with antidepressants, so this change to the classification has minimal effect on our end estimate of YLD.

Once the severity of depression and associated disability were taken into account, individuals were estimated to be suffering approximately 76,000 YLD in 2015 due to living with depression.

Data quality

In order to provide a measure of the degree of accuracy[1] and relevance[2] of the estimated disease DALYs to users, a measure of data quality has been developed for the SBoD study. This measure assigns a RAG (Red; Amber; Green) status to each disease or injury indicative of the accuracy and relevance of the estimates. Interpretation of the RAG status can be defined as follows:

Highly accurate and relevant

Estimates have been derived using relevant and robust data sources with only a small degree of adjustments performed to the input data. These estimates can be considered a highly accurate depiction of the burden incurred from the disease, condition or injury.

Moderately accurate and relevant

Estimates have been derived using reasonably relevant and robust data sources with only a moderate degree of adjustments performed to the input data. These estimates can be considered a moderately accurate depiction of the burden incurred from the disease, condition or injury.

[1] How precise, unbiased or certain the estimate is.
[2] Do we measure the thing we want to measure?

 **Uncertainties over accuracy and relevance**

Estimates have been derived using less comprehensive or relevant data sources with a high degree of adjustments performed to the input data. These estimates contain substantial uncertainties and should be used with some caution.

The data quality has been assessed using three main criteria:

- Relevance and accuracy of the data source used to measuring the population of interest
- Likelihood that the implemented disease model captured the overall burden of disease or injury
- The relative contribution of ill-defined deaths to YLL, and YLL to DALY.

These criteria are subjectively assessed and each criterion is scored on a scale of 1 to 5. Further details on these data quality measures are available on the ScotPHO website [1].

Based on these criteria, the estimates of burden of depression in Scotland are  **moderately accurate and relevant**.

Obtaining estimates of the number of individuals suffering from depression is difficult. The stigma associated with mental health conditions means that individuals may not admit to having depression, or opt to pursue non-traditional treatments [8].

We have chosen to use community-dispensed prescriptions as a measure of the number of individuals that receive antidepressants and a proxy for the number of individuals suffering disability due to depression. Antidepressants have other common indications such as use in chronic pain, insomnia and migraine [9].

Unfortunately, the data retrieved did not include information on the clinical indication for treatment, so we were unable to be specific in our identification of cases. We have excluded lower strength doses of amitriptyline to filter out the cases which were the least likely to be due to depression. Relative prevalence ratios from GBD 2015

were used to facilitate prevalence estimates separately for depression and anxiety disorders.

There will be a degree of misclassification bias in our estimate; however some of the off-label indications of antidepressants such as migraine and chronic pain have been shown to be associated with an increased risk of mental health conditions, which will help reduce this bias [10, 11]. It has also been suggested that women are more likely to present to services than men for particular mental health issues and that men are prescribed antidepressants to a lesser extent [12]. The use of prescribing data as a proxy for prevalence may therefore risk bias from differential service use.

Our study estimated a depression prevalence of 6.7% in Scotland in 2015. In comparison, the Global Burden of Disease study (GBD) 2015 estimated a lower depression prevalence of 4.3% [13]. A broadly comparable estimate was derived from the 2015/16 Quality and Outcomes Framework (QOF) in Scotland, that estimated a prevalence of 6.8% for patients aged 16 and above [14], whilst a survey conducted in the United States found a 12-month prevalence of 6.6% [15].

What next to improve estimates for depression?

Future work on the SBoD study will attempt to refine the estimates of prevalence. The improvement of prevalence estimates will include reviewing the coding and recording of depression in alternative national datasets and exploring local area datasets for information. Other alternatives include the use of general population surveys which include questions about mood as an alternative means of identifying the prevalence of depression. The development of the Scottish Primary Care Information Resource (SPIRE) will help us to improve our estimates of the burden of disease in Scotland [16]. Further to this, work will be carried out to attempt to derive estimates of severity levels that are dependent on age and that are specific to the Scottish population.

These improvements are partly dependant on exploring other data sources and reviewing evidence from high quality research that it is relevant to Scotland. Please contact the SBoD project team (nhs.healthscotland-sbod-team@nhs.net) for enquiries and suggestions on how to improve our estimates.

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